

Salt River Fire Department Operating Guidelines

Trench Rescue Operations

June 2000

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SCOPE

Rescuing the victims of a trenching or excavation cave-in may be one of the most life threatening situations we find ourselves in. When we respond to a cave-in, it is unlikely that we will have the time to implement proper trenching and shoring safety requirements.

Conditions may be so hazardous that immediate rescue may not be possible without extremely high risk to rescuers.

PURPOSE

The purpose of this procedure is to establish guidelines for operating at the scene of a trench rescue operation.

DEFINITION

A trench is a narrow excavation made below the surface of the ground where the depth is greater than the width, but the width is not greater than 15 feet.

Cave-ins happen almost instantaneously with little or no warning, which explains why trench failure usually results in injury or death.

Most fatalities occur in trenches less than 12 feet deep and 6 feet wide.

The effects and results of victim engulfment will depend on the degree and depth of burial. Since one cubic foot of soil weighs approximately one hundred pounds, a victim buried under just two feet of soil will have seven hundred to one thousand pounds concentrated on the chest and back prohibiting lung and chest expansion necessary for breathing. It's unlikely a victim will survive more than three to four minutes with cause of death being suffocation and compression injury.

The majority of trench cave-ins result from poor planning, lack of knowledge with trenches and shores, and improper or inadequate installation of shoring.

Company Officers should be aware of trench construction projects underway in their response area.

General conditions should be observed including trench depth, soil conditions, use of shoring equipment and worker safety. If there is a question of safe practices being followed by the contractor or there are obvious safety violations occurring. The Officer will deal with the

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contractor directly and contact OSHA as needed. In cases of severe danger or flagrant violations, the Company Officer may ask the contractor to cease work.

TACTICAL CONSIDERATIONS

PHASE 1 - SIZE-UP

I. The Primary Assessment

The first arriving officer should take command, begin a size-up, determine the hazards to rescue personnel, decide if additional rescue personnel and resources are needed.

A. The 1st priority will be to determine if the operation will be Rescue Mode or Recovery Mode.

1. **Rescue Mode** - This mode should be used if the victim(s) can be seen and is obviously alive or if the victim's location is known and has been down for a short period of time. Rescuers should gain rapid access to the victim(s) using the minimum amount of shoring needed to make the trench safe. This is a very dangerous operation because of the possibility of secondary collapse. Initial arriving units will attempt a rescue using shoring equipment off their engine/truck, and will rescue the victim, or after 5 to 10 minutes, change to body recovery.
2. **Body Recovery Mode** - This mode should be used when the victim has been completely buried and his/her exact location is unknown. When in the "body recovery" mode, safety of firefighters comes first.

The trench must be properly shored before recovery actions begin. Due to the nature of the emergency, Fire Department personnel (particularly Command) should consider the following guidelines:

- B. The initial response should consist of two engines, one Battalion Chief. A Trench Rescue Team and Technical Rescue Team should be requested and dispatched if conditions indicate.**
- C. Request a P.D. supervisor to respond to the Command Post for liaison and at least two police officers for scene control. This should be done while enroute to the scene.**

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- D. Spotting apparatus. The first-in company should spot the apparatus at least fifty feet from the location of the trench failure. Command should dictate level 1 staging at least 150 feet from the scene.
- E. Machinery, construction material, bystanders that are close to the edge of the trench (within two feet) can easily cause a second cave-in. Ringing the rescue area with barrier tape as soon as possible will help to prevent the problem of unnecessary personnel and bystanders being too close to the trench.
- F. Secure witness foreman or competent person.
- G. Assess the potential hazards to the rescuers.
- H. Determine the location, number and condition of victims.
- I. If there are victim(s), determine how long the victim(s) have been buried.

II. The Secondary Assessment

- A. Assess on-scene capabilities.
- B. Assess the need for additional resources.
- C. Assign a Safety Officer/sector.
- D. Sectorize and assign personnel.

PHASE 2 - PRE-ENTRY OPERATIONS

- I. Make the General Area Safe
 - A. Create a hot, warm, and cold zone.
 - 1. Hot zone extends 0-50 feet
 - 2. Warm zone extends from 50-150 feet
 - 3. Cold zone extends from 150-300 feet
 - B. Control traffic movement.
 - 1. Shut down roadway
 - 2. Re-route all non-essential traffic at least 300 feet around the scene.
 - C. Control the crowd.
 - 1. Remove all non-essential civilian personnel to at least 150 feet from the incident.
 - 2. Remove all non-essential rescue personnel at least 50 feet from the incident.
 - D. Shut down all heavy equipment operating within 300 feet of the collapse.

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E.

II. Make the Rescue Area Safe

- A. Control all hazards in the area, complete lockout/tagout procedures i.e., utilities, electric, gas water.
- B. De-water the trench if necessary.
- C. Monitor the atmosphere in the trench.
- D. Ventilate the trench if necessary.
- E. Identify soil type and conditions.

PHASE 3 - RESCUE OPERATIONS

I. Make the Trench Lip Safe

- A. Don appropriate level of personal protective clothing.
- B. Approach the trench from the ends if possible.
- C. Look for unidentified hazards (i.e., fissures, unstable spoil pile).
- D. Assess spoil pile for improper angle of repose and general raveling.
- E. Remove any tripping hazards (i.e., shovels, shores, tree roots).
- F. Provide level area for ground pads.
- G. Place ground pads around lip of trench.

II. Make Trench Safe

A. Extrication Sector Responsibilities

Extrication Sector will be responsible for entry operations. Extrication Sector shall ensure that all personnel operating in the hot zone is wearing steel-toed safety shoes, helmet, eye protection, and gloves.

- * Place ingress and egress ground ladders in trench. There should be at least 2 ladders placed in the trench no more than 50 feet apart.
- * Decide on shoring system to be used (i.e., hydraulic shore, screw jacks, timber shore).